PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference MH503890/142	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International Application No. **PCT/NZ2003/000160**	International Filing Date *(day/month/year)* 23 July 2003	Priority Date *(day/month/year)* 24 July 2002
International Patent Classification (IPC) or national classification and IPC **Int. Cl.**[7] B01D 1/28, 5/00 A23C 1/12, 1/00		
Applicant DISTECH LIMITED et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 3 sheet(s).

3. This report contains indications relating to the following items:

I	☒	Basis of the report
II	☐	Priority
III	☐	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
IV	☐	Lack of unity of invention
V	☒	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
VI	☐	Certain documents cited
VII	☐	Certain defects in the international application
VIII	☐	Certain observations on the international application

Date of submission of the demand 19 February 2004	Date of completion of the report 1 September 2004
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer **SARAVANAMUTHU PONNAMPALAM** Telephone No. (02) 6283 2070

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/NZ2003/000160

I. Basis of the report

1. With regard to the **elements** of the international application:*

☐ the international application as originally filed.

☒ the description, pages **1,3 -5.** as originally filed,
pages , filed with the demand,
pages **2** received on **18 August 2004** with the letter of **18 August 2004**

☒ the claims, pages , as originally filed,
pages , as amended (together with any statement) under Article 19,
pages , filed with the demand,
pages **6 & 7** received on **18 August 2004** with the letter of **18 August 2004**

☒ the drawings, pages **1-3** , as originally filed,
pages , filed with the demand,
pages , received on with the letter of

☐ the sequence listing part of the description:
pages , as originally filed
pages , filed with the demand
pages , received on with the letter of

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages

☐ the claims, Nos.

☐ the drawings, sheets/fig.

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report*

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims **1-8**	**YES**
	Claims	**NO**
Inventive step (IS)	Claims **1-8**	**YES**
	Claims	**NO**
Industrial applicability (IA)	Claims **1-8**	**YES**
	Claims	**NO**

2. Citations and explanations (Rule 70.7)

NOVELTY (N) and INVENTIVE STEP (IS)

A. The documents constituting the closest prior art are:

(i) WO 2001008779 A
(ii) US 5019218 A
(iii) US 5417084 A

B. The subject matter of claims 1 & 6 differs from these prior art documents in that the use of a single vacuum vessel / chamber for containment of all the components of a liquid concentrator.

C. The distinguishing features of the invention will improve the vacuum sealing arrangement for a liquid concentrator.

D. Therefore the application satisfies the criteria set forth in PCT Article 33(2-3), concerning the novelty and inventive step of the independent claims 1 & 6.

E. The criteria concerning novelty and inventive step of claims 2-5 & 7,8 are satisfied because these claims are dependent on claims 1 & 6.

INDUSTRIAL APPLICABILITY (IA)

The invention defined in claims 1-8 satisfies the criterion set forth in PCT Article 33(4).

interconnected components all or some of which are required to operate under a vacuum. The term "concentrator" as used in the present specification is therefore to be understood to cover all such apparatus.

Objects of the Invention

It is thus an object of the present invention in one embodiment thereof to provide a liquid concentrator which overcomes or at least ameliorates problems with such liquid concentrators available to the present time and/or which at least will provide the public with a useful choice.

Further objects of this invention may be become apparent from the description.

Summary of the Invention

According to one aspect of the present invention there is provided a liquid concentrator having a plurality of components required to operate in use under vacuum and wherein said components are adapted to be provided within a common vacuum vessel or chamber and within which a required vacuum can, in use, be established, said components including a feed section for receiving the liquid to be concentrated, an evaporation/condensing section to produce concentrated liquid and vapour, a separation means to separate the concentrated liquid from the vapour and a vapour compression means, all accommodated within the vacuum vessel or chamber.

According to a further aspect of the present invention there is provided a method of constructing a liquid concentrator having a plurality of components each required to operate under a vacuum, said method including providing said components with a common vacuum vessel or chamber and adapting said vacuum vessel or chamber to have a required vacuum established therein, said components provided within the vacuum vessel or chamber including a feed section and an evaporation/condensing section having a separation area to separate concentrated liquid and vapour and a vapour compression means.

According to a still further aspect of the present invention a liquid concentrator and/or a method of constructing a liquid concentrator is/are substantially as herein described with reference to the accompanying drawing.

Further aspects of this invention which shall be considered in all its novel aspects

CLAIMS

1. A liquid concentrator having a plurality of components required to operate in use under vacuum and wherein said components are adapted to be provided within a common vacuum vessel or chamber and within which a required vacuum can, in use, be established, said components including a feed section for receiving the liquid to be concentrated, an evaporation/condensing section to produce concentrated liquid and vapour, a separation means to separate the concentrated liquid from the vapour and a vapour compression means, all accommodated within the vacuum vessel or chamber.

2. A liquid concentrator as claimed in claim 1 wherein a drive means for the said vapour compression means is provided outside said vacuum vessel or chamber and a sealing means provided about a shaft of the compression means to enable its entry into the vacuum vessel or chamber and its connection, to drive, said vapour compression means.

3. A liquid compressor as claimed in claim 1 where a drive means for the said vapour compression means is also provided within said vacuum vessel or chamber.

4. A liquid concentrator as claimed in claim 1 in which the vapour compression means produces compressed steam pressurised between about .2 bar (a) to .4 bar (a) and temperatures of the feed liquid and concentrate are between about 60°C to 70°C.

5. A liquid concentrator substantially as herein described with reference to any one of the embodiments of the accompanying drawings.

6. A method of constructing a liquid concentrator having a plurality of components each required to operate under a vacuum, said method including providing said components with a common vacuum vessel or chamber and adapting said vacuum vessel or chamber to have a required vacuum established therein, said components provided within the vacuum vessel or chamber including a feed section and an evaporation/condensing section having a separation area to separate concentrated liquid and vapour and a vapour compression means.

7. A method as claimed in claim 6 in which said components included within the vacuum vessel or chamber include a drive means for said vapour compression means.

8. A method of constructing a liquid concentrator substantially as herein described with reference to any one of the embodiments of the accompanying drawings.